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ABSTRACT

Fox Valley Technical Institute (FVTI) has developed an approach to education which emphasizes competency-based, round-the-clock education entailing short terms, flexible class schedules, and individualized instruction and which has as its focus strong computer support at classroom, technical, and management levels. The college provides 6,000 full-time and 40,000 part-time students with more than 3,000 courses in 90 occupational fields. Students may register for classes at 3-, 6-, 9-, or 12-week intervals, as soon as the classroom space is available. This free-form structure is made possible by the support of computer systems to handle the thousands of class schedules and administrative and instructional details required of competency-based education. The college's success in automating the educational process was the result of lengthy planning and systematic implementation that began in 1970 and resulted in the Automated Office System (AOS) in operation at the college. The AOS is designed to improve staff communication and includes a training component for board members, administrators, technicians, and support staff. Other innovations include a Student Information and Advisement System to provide information on students, classes, courses, and instructors; a student accounting system that places students in classes and records the completion of courses; a cognitive mapping system to determine how students can learn best; instructional computing support services and computer-assisted instruction; and computer-assisted career guidance programs. (HB)

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IBM

Computer Supported Education at Fox Valley Technical Institute

ED258643

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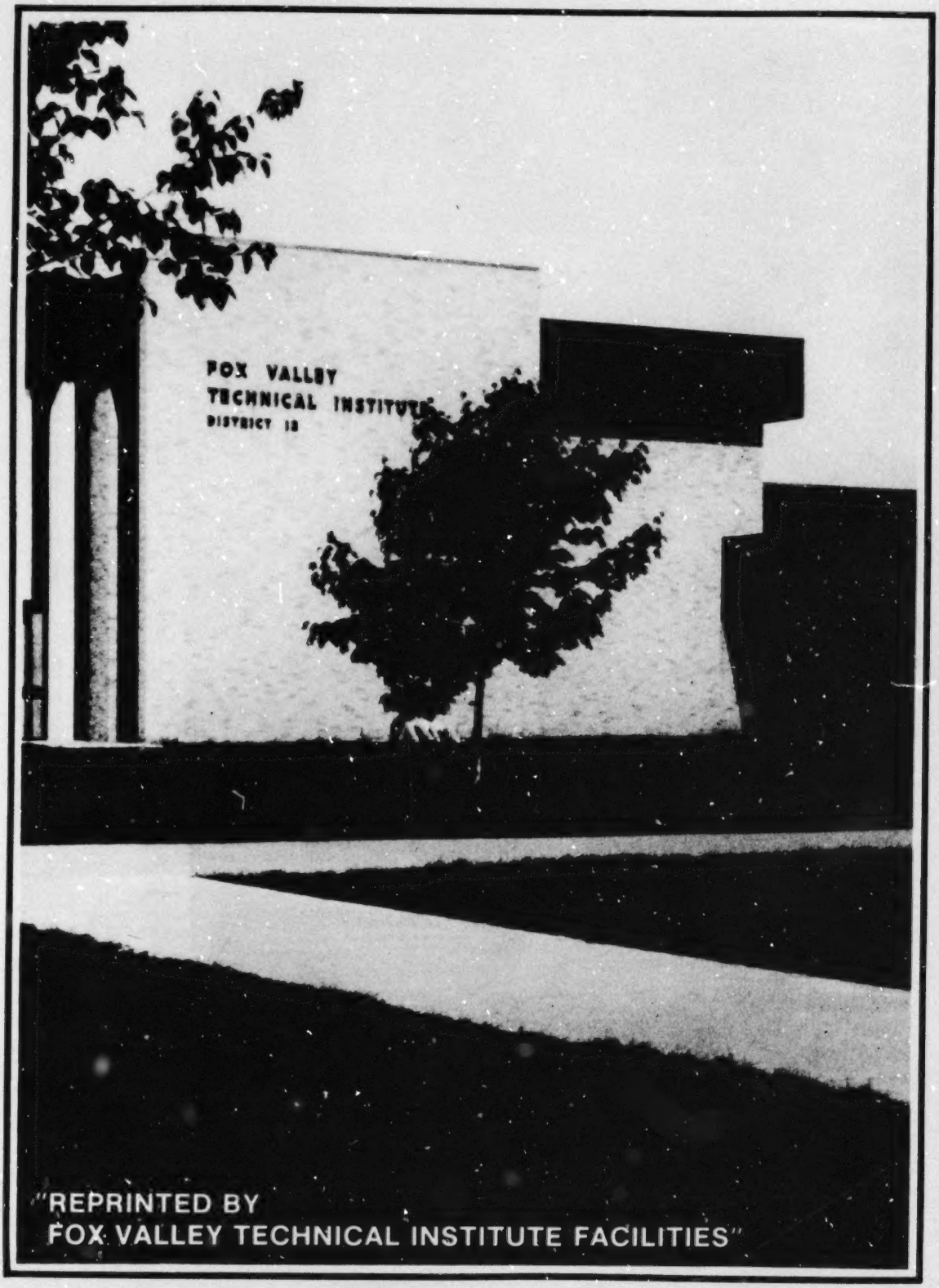
FOX VALLEY
TECHNICAL INSTITUTE
DISTRICT 12
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Fox Valley Technical Institute in Appleton, Wisconsin, has effectively merged administrative, instructional, and office computing systems together. This institute has made it possible for the user of a single terminal to achieve electronic access to any function of these three systems. As a result, FVTI has become well-known for computer applications at classroom, technical, and management levels.

Fox Valley Technical Institute provides 6,000 full-time and 40,000 part-time students with more than 3,000 courses in 90 occupational fields. Students are offered competency-based, round-the-clock education entailing short terms, flexible class schedules, and individualized instruction. The institute's extensive educational program serves a five-county district just south of Lake Michigan's Green Bay, a mission complicated by growing numbers and enormous recordkeeping. But FVTI found solutions to overcome the difficulties.

Innovative educational techniques and strong computer support were developed to integrate administrative, instructional, and office systems and disseminate information to hundreds of terminal workstations. Thus, FVTI is now better able to meet the shifting demands of students and to supply local industries with graduates who can bring greater competency to jobs.

Other significant benefits are:

- Lower operational costs
- Higher productivity among faculty and administrative personnel
- Greater curriculum and class scheduling flexibility
- Better staff communication
- Heightened responsiveness to community needs

Accent on Flexibility

FVTI's community responsibilities include a curriculum that meets the changing demands of the students and industries in the area it serves. "We must respond to our market," says Dr. Stanley J. Spanbauer, district director, "and the way to do that is to be flexible. That means that we must capitalize on available technological tools that will help us adapt to the changing needs of job-seeking students and area employers who are looking for qualified employees."

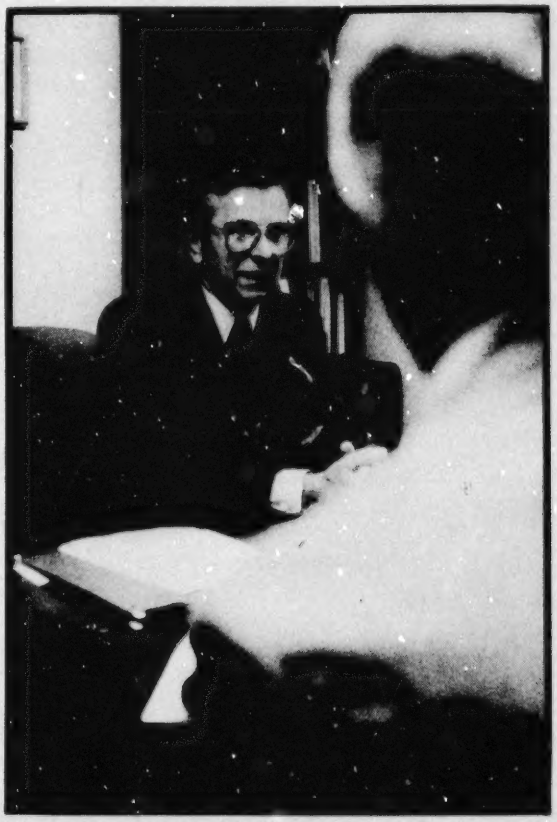
While much of FVTI's instruction is conducted in a conventional lecture format, alternative approaches such as individualized instruction, computer-assisted learning, laboratory and shop time, and closed-circuit TV tutorial sessions, are used. Further, courses may follow flexible schedules to accommodate individual needs.

Students are permitted to begin courses as soon as classroom space is available and to proceed at their own pace. In many situations, students complete courses in less time than usual. This makes it possible for the school to accept additional students, thus keeping facilities in full use.

Students register for classes at three-week intervals, or they may register for six-, nine-, or twelve-week periods. With a year-round scholastic schedule, it is possible for some students to begin their studies while other students graduate every three weeks.

Such a free-form structure would be impossible without computer systems, according to Dr. Spanbauer. "It would be impossible to control thousands of class schedules and handle the myriad of administrative and instructional details that competency-based education entails," he continues. "But even though we have broadened our capabilities and offer students more than ever, FVTI frequently maintains the lowest educational cost per-student of the 16 tax-supported districts in Wisconsin. In 1967, before we became really serious about computer systems, the institute had the highest cost per student. This remarkable turnaround is attributable in large measure to our integrated computer system that is now composed of IBM 4341 and 4361 Processors, in addition to 6670 Information Distributors, and workstations of Displaywriters, 3270s, and Personal Computers."

Dr. Stanley J. Spanbauer, district director, chats with a visitor in his office.



The institute relies on IBM hardware and software to hold its leadership position in computer-assisted education. "We like IBM because its products are dependable and the company offers complete and reliable support," says Don Beno, administrator of finance and information services, who directs Fox Valley's financial affairs and the computing facilities. "When we decided to invest our time and money in an up-to-date computer environment," Beno recalls, "we knew what we wanted but we lacked the electronic sophistication to design our own systems. IBM conferred with us, gave us technical advice, and supplied us with the necessary resources to make it work."

Computing Integrated in Daily Activities

Fox Valley's outstanding success in automating education processes is the result of lengthy planning and systematic implementation. It was in the early 1970s that the school decided to introduce the computer into its daily operations and now most of FVTI's activity is touched by data processing systems. A student walks into a building that is environmentally controlled by a computer, registers for courses on a computer terminal, uses terminals in classroom work, and buys supplies whose inventory is maintained by a computer.

Staff members also use the computer everyday. The accounting manager uses it for budget modeling. The food service workers use it to maintain inventories of perishable products. The communication skills instructor uses it to drill and test students. The district director uses the office system to communicate with his staff. In addition, administrators exchange calendar information, and office workers create and manage text requirements via this same system.

The computer had so permeated life at Fox Valley that, in December 1982, Dr. Spanbauer launched a campaign for computer literacy at the institute. He encouraged training in data processing concepts for every student and urged that the institute's managers, secretaries, and instructors seize the opportunities inherent in the 1980s information revolution.

"Computers are transforming us into an information society," Dr. Spanbauer said at the time. "If we are to take advantage of stored information, we must master the use of new computer-based tools to work smarter and more effectively."

Don Beno (right), administrator of finance and information services, confers with Robert Keehan, systems analyst.

Nowhere at FVTI are the effects of computer literacy more readily observed than in its word processing center, which evolved from a traditional clerical pool.

Having taken on the challenges of the computer age, the center in 1982 responded to a request by the school's data processing department and IBM to develop a new approach to word processing.

As it was conceived, the program merged functions of the main computer and word processing to automate office procedures. For example, from a computer terminal, a document is keyboarded, checked for spelling, and sent to a laser or ink jet printer at another location, all at the touch of a finger.

Dr. Spanbauer directed that these tools be available to the entire institute's staff to increase their efficiencies and effectiveness. The acceptance and application of these technologies has been quick and productive. Fox Valley calls their highly successful office system the Automated Office System.

Automated Office System

Three types of Automated Office System (AOS) training have been developed to move toward the concept of the "paperless office".

(1) Board members, administrators, and management personnel receive approximately 12 hours of computer familiarization study over a three-week period. This instruction focuses on terminal operation, an AOS overview, and FVTI standards for the system.

(2) Technicians and support staff members receive 40 hours of training in AOS mechanics over a six-week period. Periodic group refresher sessions are held for personnel already trained on the system. Training for technical users takes place in the word processing center.

(3) Concept/curriculum training is given to all faculty and board members, administrators, and management personnel. Instructors receive the regular concept training and are offered an optional 20 hours of additional training in the use of data processing to prepare curriculum and learning materials.

The Automated Office System extends into curriculum processing where WisCom (Wisconsin Competency-Based Occupational Curriculum Data System, a FVTI developed application) is used for the design and dissemination of course offerings.

Curriculum data is keyed in, with outlines, tasks, objectives, student learning materials and evaluations arranged according to a standard organizational structure and indexing system. All standard formats are available on the institute's Automated Office System.

One productive spin-off from automated curriculum management is the school's ability to respond to requests by business organizations for specific courses of study. Such proposals, if found to be workable, are important in shaping Fox Valley's training programs.

Vonnie Seegers, manager of word processing, in the word processing center.

First, FVTI determines if it has the curriculum to fill a specific request. Before automation, it took days of gathering information on resources and calculating costs. Now, with a curriculum data bank, FVTI administrators know within hours what can be offered, how much it will cost, and when the school can begin the course. Such a timely response helps industries avoid costly training programs of their own and strengthens Fox Valley's role in the community.

Professional Office System (PROFS)

The Automated Office System is built on the IBM products PROFS (Professional Office System) and DCF (Document Composition Facility).

Fox Valley's continuing program to improve staff communications has been strengthened by PROFS. Personnel on the main campus and each branch campus can now communicate electronically. Additionally, this system helps administrators maintain calendars, schedule meetings by viewing their own schedules and those of other staff members on terminals, and coordinating the use of conference rooms and audio-visual equipment. Users can check their personal calendar for any day or month and then add, cancel, or move appointments, thus avoiding time-consuming telephone calls to schedule convenient meeting times.

Within the electronic mail function, there are special aids for simplifying the typing of letters and memos. Document styles can be set up in advance; then, PROFS asks for information about the subject, the reference, and the copy list. To save time and typing errors, information about the author (name, title, department, etc.) is correctly inserted into the document. After the document is typed, the system proofreads and prints it or it is set aside to await changes. Draft documents can be distributed for review.

PROFS facilitates access to decision support systems and other productivity aids for management. Presentation graphics are used by managers to create visual presentations of data for advisory committee and board meetings. A spreadsheet application provides managers with a facility to simulate models for budget development and data analysis.

PROFS provides Fox Valley's Automated Office System with a facility for:

- Text preparation and printing
- Electronic text distribution
- Central filing and retrieval services
- Personnel services
  - Calendars
  - Scheduling meetings
  - Memos and reminders
  - Decision support access
  - Personal computing tools

Student Information and Advisement System

FVTI's staff-developed Student Information and Advisement System provides online processing of information about students, classes, courses, and instructors, and permits a unique approach in developing class schedules. Using the system's resources, administrators perform such functions as registration, admission, program advisement and modification, transcript preparation, class rosters, fee processing, grade posting, and refund processing.

The student advisement feature is a significant benefit to the institute. The computer tracks students and provides information to determine if they are enrolled in studies that do not fit their capabilities. Students, as a result, are guided toward studies best suited to their ability to progress.

A typical scenario would find a guidance counselor at a terminal calling up a student's records to identify how completed courses might be applied to a different program. To do this with a catalog would be time consuming and require that the advisor list courses and exceptions that are often unclear to the student. The computer calculates the requirements of a program transfer and after the student has had an opportunity to discuss with the counselor the data that appears on the screen, the computer produces a printed copy of the results.

The system not only helps to prevent dissatisfied or discouraged students from dropping out, but it makes educational programs more meaningful.

According to Robert Keehan, systems analyst, automated records make it possible to bring together the best possible combination of students, staff, and facilities at all locations in the district. "We're using classroom, shop, and instructor resources to the maximum," Keehan says,"and most programs are running to capacity, with many having waiting lists. This means the greatest number of students can be served at the lowest cost."

Keehan continues: "It's possible for students to complete courses and receive credit before or after the scheduled time. The instructor can turn in grades at any time for posting to student records, and those grades will be part of the record the next time a student's program is reviewed."

Admitting a student to a class at the last moment poses no problem for the instructor because a new roster is generated to show an addition to the class in time for the next session. Similarly, if a student withdraws within the allowed time, a refund can be processed and a new roster is generated for the instructor.

Student Accounting System

Another FVTI innovation that helps manage competency-based education on a large scale is the Student Accounting System. This enables instructors to place students in classes and record the completion of courses without a conventional semester calendar. It permits registration at virtually any time. Setting up course and student records and preparing class rosters for instructors are accomplished without special effort.

Student data files consist of hierarchical, cross-referenced files. With proper authorization, these files can be accessed online by the data processing staff, the registrar, or by a department head.

At registration, the student requests the courses desired. The computer places the student in available sections and totals the fee. If conflicts occur or a course is filled, the registration clerk can immediately resolve the problem with the student. When courses become filled to capacity, the registrar is advised by the system and action can be taken, as required.

After registering, the student pays the fee and a cashier enters the transaction at a terminal. This updates the student's record and permits credit to be given when the course is completed.

Student records contain personal data, programs undertaken, courses completed, grades earned, current courses, attendance, and financial status. The master course approval file contains approved courses, department category, hours, title, and credits.

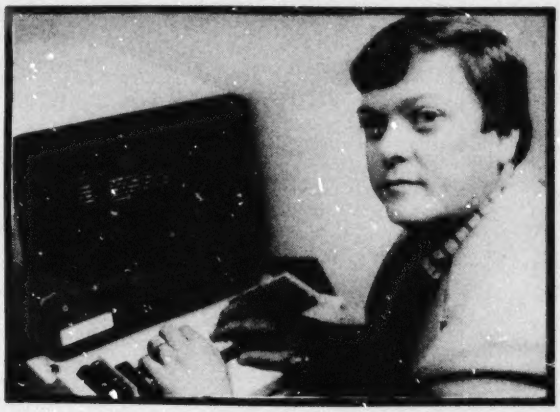
The efficient use of disk storage for student information required a data base technique in organizing data. Since students' programs vary widely in the number of courses taken or in the length of time enrolled, a standard record format for all information was not practical. Certain general information such as name, address, social security number and program are maintained in a base file. A pointer at the end of this record takes an inquiry to a detail file and to the student/course records stored at the next available space and chained by pointers.

Inquiry responses and reports generated by the Student Accounting System can begin with the master course, course offering, or student identification number. By searching through associated records, information about a student, a course, or a specific class is available. IBM's Data Base Management System assists in managing FVTI's recordkeeping requirements.

Job descriptions for full-time positions and the organizational structure of Fox Valley are also maintained in similar fashion. These tie in with various accounting functions to provide additional data bases.

One specific data base ties together the policies and procedures covering the daily administrative and instructional processes. As updates and new information must be circulated, the system automatically distributes to the respective departments the new copy that highlights revisions and new information.

Joseph F. Wiegand, manager of computing services, at a terminal to check his appointment schedule.



Cognitive Style Mapping

Students at Fox Valley investigate how they can best learn through cognitive style mapping, a success-oriented approach to classroom management. The system is based on a computerized inventory process to determine a person's preferred style of learning. The student, counselor, and the instructor all use the information about the student and the class to meet instructional objectives.

The cognitive mapping process was adopted from the work of the late Dr. Joe Hill of Wayne State University in Detroit, Michigan. Dr. Hill's theory maintains that by determining 27 achievement and personality components of an individual, a map can be drawn that indicates the conditions under which the individual learns best.

When FVTI adopted cognitive mapping, it added a computer process that clearly interprets the achievement and personality components. It has been so well received that the institute has made the testing and processing available to guidance professionals in industry and other institutions on a fee basis.

Instructional Computing Support

Fox Valley uses MUSIC (McGill University System for Interactive Computing) to deliver and manage instructional computing services. MUSIC provides a high function, high performance, easy to use, instructional computing system that enables FVTI to respond in a cost effective manner to the growing demand for computer based instructional opportunities.

Students in introductory computer literacy courses are introduced to programming languages, full screen editor, and the MUSIC library system. Students working with the computer as an integral part of their course requirements, use computer tools such as problem solving or word processing applications. These, and other students, learning through CAI (Computer-Assisted Instruction) opportunities, need to learn only one system to access the computer — MUSIC.

MUSIC, in turn, provides equitable use with monitoring and security controls for the student environment. The automatic services of MUSIC free people resources to develop instructional applications and to devote more time to teaching.

Output of the cognitive mapping process.

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FVTI COGNITIVE STYLE MAP FOR                    ID NO          SEX F                    (C) COPYRIGHT FOX VALLEY TECHNICAL INSTITUTE 1
                                PROGRAM 158 POLICE SCIENCE
PROCESS DATE  78/07/XX          TEST 6 SCORE 30
CURRENT DATE  08/11/XX          TEST 4 SCORE 60 GRADE +15.0  PERCENTILE 96

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 .Q(CEM)                       .  .  A*.  .     L    . CEM 50-59   M   50-59
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 LECTURES, CASSETTE TAPES ARE EFFECTIVE TOOLS FOR TEACHING CONCEPTS AT ANY LEVEL OF DIFFICULTY.
 PICTURES, SLIDES AND DEMONSTRATIONS ARE USEFUL TOOLS FOR TEACHING CONCEPTS OF AVERAGE DIFFICULTY ONLY.
 PROBABLY WILL REQUIRE PACING BY AN INSTRUCTOR UNTIL CONFIDENCE BUILDS.
 SUGGEST OBSERVATION TO DETERMINE IF MOTIVATION IS NECESSARY.
 SEEMS TO PREFER A SITUATION WHERE GROUP INTERACTION IS MINIMAL.
 IS VERY CONCERNED ABOUT APPEARANCE OF FINISHED PRODUCT.
 APPEARS TO HAVE LOW INTEREST IN PRACTICING BASIC MOTOR SKILLS TO ACHIEVE A HIGH LEVEL OF PERFECTION; MAY
      NEED ADDITIONAL MOTIVATION TO ACHIEVE MASTERY ON MOST TASKS.
 SEEMS TO PREFER MUCH INTRODUCTORY WORK IN NEW SITUATIONS TO IDENTIFY ROLE.
 PROBABLY NOT INTERESTED IN ACCEPTING A LEADERSHIP ROLE IN A GROUP SITUATION.
 MAY NEED INDIVIDUALIZED ATTENTION WITH MOST ACTIVITIES REQUIRING MOTOR COORDINATION.
 HAS LOW AUDITORY (SOUND) DISCRIMINATION.
 INDICATES A PREFERENCE FOR A STRUCTURED, FACULTY-PACED SITUATION (GROUP OR INDIVIDUALLY).
 APPEARS TO NEED TIME AND MUCH INFORMATION TO APPRAISE BEFORE MAKING A DECISION, ESPECIALLY WITH NEW TASKS.
 APPEARS TO USE RULES/DEFINITIONS TO MAKE A DECISION.
 APPEARS TO LEARN MATHEMATICS MORE EFFICIENTLY USING AUDITORY METHODS (CASSETTE TAPES/TUTORS/TEACHERS).
 READS AT AN ACCEPTABLE LEVEL.
 GRAMMAR SKILLS ARE ACCEPTABLE.
 WRITTEN MATERIALS (TEXTBOOKS, PACKAGES) ARE EFFECTIVE TOOLS FOR TEACHING CONCEPTS AT ANY LEVEL OF
     DIFFICULTY.
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Computer-Assisted Instruction Maximized

Fox Valley has maximized computer usage as an aid to vocational instruction. Shelley W. Foster, manager of computer-based education and training, points out that FVTI embraced the concept from the institute's beginning in 1971. "The school felt that the idea of giving any workstation access to any function of the computer system would work and that it would be cost-effective and efficient if it could be developed and managed. By achieving this, Fox Valley has proved that it was right," Ms. Foster says.

"The big payoff," she continues, "is that we don't need separate hardware to support instruction. An important benefit enables us to easily integrate instructional data into the student record system. Also, if a terminal is out of service for any reason, any available workstation can be brought into service for the purpose at hand."

Ms. Foster cites another significant advantage. "When the school began to expand into branch campuses, the workstation concept became more important. It enabled these campuses to easily adopt the computer-assisted instruction mode as well."

Instruction, Drill, and Testing

Computer-assisted instruction enables students to learn at their own speed, drill themselves, and take exams when they feel ready, even if the time required for proficiency is shorter or longer than designated in the schedules.

Of the more than 100 modules and submodules available through computer terminals, most are aimed at the drill and testing functions thereby freeing instructors from much of the routine work normally encountered.

How Fox Valley has expanded its teaching resources is illustrated by the following situation:

> A student reports to a monitor for a computer terminal reservation and, at the appointed time, sits down at the interactive workstation, signs on, and begins to respond to drill questions. This student is majoring in food services and will require up to 20 hours in drills and tests to complete the course. Reinforcing and testing what the student has studied in class, the nutritional course module bypasses much faculty involvement and permits the student to work at his or her own pace at convenient times.

The significance of this situation is that the school is channeling faculty work to computer-managed instruction (CMI) and computer-aided instruction (CAI) facilities.

In the food service department, 25 test and drill course modules enable the school to work with 150 students each semester. Without the computer system, the program would be limited to only 50 students.

In the communication skills department, students receive instruction at terminal workstations where computer applications such as word processing are introduced.

Dr. Frederick P. Timm, a communication skills instructor who helped develop the first CAI courses at Fox Valley, tells how these courses are instrumental in maintaining a low teacher-student ratio. "If we allowed students to learn at their own speed and had no computer assistance, we would need about one teacher for every three or four students."

For repetitive drills, students prefer to work at terminals. "As a result, significantly fewer students are dropping out of the communication skill program," says Dr. Timm.

Shelley W. Foster (right), manager of computer-based education and training, assists a student in the data processing laboratory.

Students using terminals in the data processing laboratory.

Eight English communication skills course modules teach grammatical concepts. These modules are administered at terminals in drill and practice modes, while the computer monitors student progress through the prescribed sequence. At any time, the student can repeat segments, obtain a performance report, or review questions. The instructor can call up the students' records to check their progress to determine if any students are having difficulty.

Other CAI/CMI modules in use are:

- Accounting
- Advertising
- Career Development
- Chemistry
- Computer Science
- Criminal Justice
- Fashion Merchandising
- Geography
- Fire Science
- Guidance
- Marketing
- Mathematics
- Metal Fabrication
- Nursing
- Paper and Pulp Technology
- Real Estate
- Secretarial Science
- Sociology
- Welding

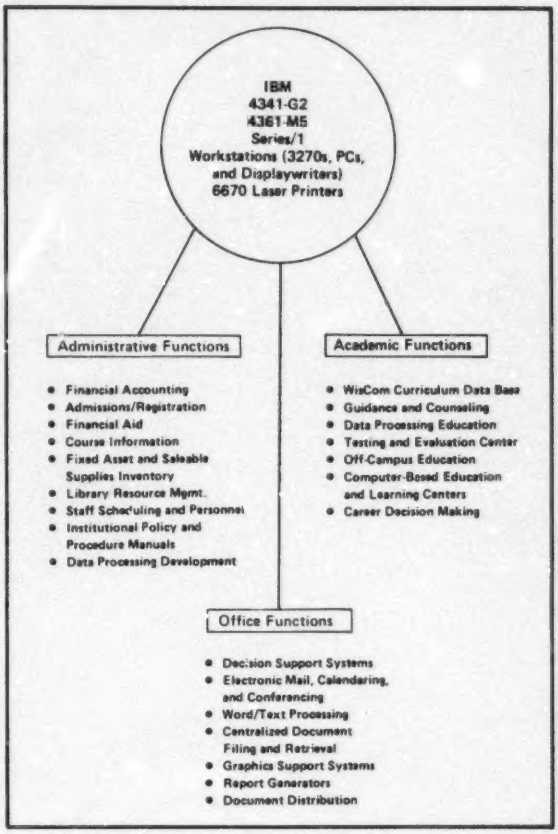
Fox Valley is acknowledged in courseware development leadership. Institution and industry educators have participated in workshops and special consulting sessions offered by Fox Valley covering techniques of developing courseware in this instructional form. Courseware at Fox Valley is developed using IBM's Interactive Instructional Authoring System (IIAS). IBM Program Products developed at Fox Valley are English Communication Skills (COMSKL-II) and Fundamental Accounting.

Guidance

The Fox Valley Vocational, Technical and Adult Education District Board has undertaken a pilot program in career education using the DISCOVER career guidance system. This software package is used as a complete unit to guide an individual through all phases of career development or as a single component to highlight a particular area of career requirements.

The program is being offered in FVTI district high schools and industry where participants answer a series of questions presented on a terminal screen. The result provides an analysis of the person's interest and abilities.

Diagram of FVTI's comprehensive programs embodying computer-assisted instruction.



Fox Valley Technical Institute's data processing facilities are built around IBM's 4341 and 4361 Processors and VM/CMS* based software that includes DOS/VSE*, CICS/VS*, DL/1*, MUSIC*, PROFS*, IIS*, DCF*, GDDM*, and DISCOVER*.

DL/1 was used by the application programming staff to develop the following:

- Student Records System: Incorporating a data base for all student information from admission and registration through graduation
- Financial Accounting System: Covering budgeting through year-end reporting
- Inventories: Maintaining records on supplies; a complete library system for acquisitions, circulation control, and so on; and perishable goods in food service
- Centralized Mailing System: Selective mailing to potential clients of the school
- Policy and Procedure Manual System: Producing and updating manuals

Joe Wiegand, manager of computing services, believes it was a wise decision to invest in data base software. "It enables us to meet new requirements without drastic changes to our application software," he says. " Also, we now require fewer programmers for this task. DL/1 provides the integrity needed for our records system. When programmers were largely responsible for record maintenance, errors occurred and student data was sometimes lost. I don't worry about that any more."

*VM/CMS (Virtual Machine/Conversational Monitor System)
DOS/VSE (Disk Operating System/Virtual Storage Extended)
CICS/VS (Customer Information Control System/Virtual Storage)
DL/1 (Data Language 1), PROFS (Professional Office System)
MUSIC (McGill University System for Interactive Computing)
DCF (Document Composition Facility)
GDDM (Graphical Data Display Manager)
IIS (Interactive Instructional System)
DISCOVER (a career guidance system developed by the DISCOVER Foundation, Inc., Westminster, MD.)

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- Fox Valley's computer support integrates office systems, administrative, and instructional systems into a total support system.
- The institute recognizes the importance of access to information at all levels. Support systems are designed to provide authorized access on demand.
- Information can be retrieved, with proper authorization, on terminals anywhere in the FVTI network, including regional campuses. If one terminal is out of service, another terminal may be used.
- Fox Valley Technical Institute's assemblage of computer systems creates flexibility that permits students to complete courses at their own pace and receive personalized instruction.
- Computer assistance lowers the cost of administration and student services. For example, all registration tasks are handled by only three clerical personnel and only one person is needed for admissions.
- Students may study and take tests at terminals in branch locations, thus saving commuting time and costs.
- FVTI, in using automated tools and established standards (WISCOM), can develop a curriculum that can be adjusted to the changing needs of students and industries.
- The Automated Office System increases productivity, speeds communication, permits flexibility, and fosters higher job satisfaction among users. Documents, correspondence, and forms prepared by the Automated Office System provide quality output, and are consistent in author style and format.
- Electronic mail, conferencing, and calendaring via PROFS, are essential tools of time management at Fox Valley.
- Fox Valley, with IBM's assistance, has developed systems that support FVTI's innovative educational opportunities.

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Fox Valley Technical Institute has demonstrated that the key functions of education can be linked and given strength by means of integrated computer systems. This enables one vast pool of information to serve many uses among students, faculty members, and administrators. Data has become more accessible, manageable, and, consequently, more useful.

Having made significant advances in computer-supported education, the institute aspires to greater achievements in the future. "We don't want to be considered a traditional school," says Dr. Spanbauer. "We're dynamic, we're willing to change, and that means that we must develop more computer-aided systems."

Dr. Spanbauer foresees the student use of computer facilities at school and in the home as perhaps the most significant factor in the institute's future. He predicts that students will soon "dial up" systems and take courses wherever they happen to be at the time. "We will still need teachers," he observes, "but students will have additional technical tools to assist in learning. Teachers will perform in many new roles, for example, as designers of instructional systems and managers of information."

Also envisioned is the use of the IBM Audio Distribution System (ADS) which will be integrated with the Automated Office System and will merge the telephone to the computer. With ADS, telephone calls will never go unanswered and audio messages will no longer be lost. They will be retrieved when the person called is again available. Dr. Spanbauer believes this system will help ensure higher staff productivity.

Other projects planned at FVTI are:

- Use of robots in programs covering electrochemical, machine tool, fluid power maintenance, and welding.
- Use of a computer-integrated machining cell where processes are automated for training skilled tradespeople, technicians, engineers, and technical educators in Computer Numerical Control (CNC), computer programming, and manufacturing system design and maintenance.
- The employment of an automatic robot transfer line that will move parts from one workstation to another. It will be part of an automatic materials handling system that will help students learn the hardware and software processes of programming and the intricacies of interfacing robots with other manufacturing equipment.
- Integration of text and graphics for document preparations as offered by the IBM 4250 Printer and associated software. This new facility will be used by Media Design Services and Graphic Art instruction.
- Introduction of CADAM (Computer-Aided Design and Manufacturing). In addition to anticipated uses of this application by FVTI drafting students, plans are in place to provide Restaurant Management students with experiences in designing floor layouts, for example, to increase services efficiencies or to maximize seating. Interior Design students will also benefit from CADAM by using it to design model room layouts.

Administrators at Fox Valley are convinced that the technological revolution is as much a part of education as it is a stimulus to business, industry, and agriculture, and that the school will face increasingly complex challenges associated with the information age. As one of the few educational institutions requiring students and staff to embrace new information systems and to have them to work creatively, FVTI is fulfilling its commitment to prepare students for productive roles in the technological future.

Fox Valley Technical Institute's 140-acre main campus is in Appleton, Wisconsin, with branch facilities in Wautoma, Clintonville, Chilton, Neenah, and Oshkosh. Classes are also conducted in 26 high schools and other locations in the five-county district served by the institute.

Associate degrees are awarded to students who complete the two-year programs in 34 technical areas. Vocational courses train students for jobs as auto mechanics, truck drivers, machine tool operators, and bakers, while apprenticeship programs enable students to combine classroom learning with on-the-job training in such fields as plumbing, carpentry, welding, and electronics.

In addition, the institute offers specialized educational programs that include safety and public service training for volunteer firefighters, general and vocational training for new citizens, literacy and language courses for adults, farm training classes, and specialized, quick-start educational programs for business and industry.

As a measure of its success in training people for employment, more than 80% of FVTI's graduates are placed in jobs.

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